

TWR-19493
Revision A

**FIELD JOINT ASSEMBLY FIXTURE (FJAF)
SHIM CALCULATION PROCEDURE**

May 1989

Prepared for:

**NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GEORGE C. MARSHALL SPACE FLIGHT CENTER
MARSHALL SPACE FLIGHT CENTER, ALABAMA 35812**

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**(NASA-CR-183705) FIELD JOINT ASSEMBLY
FIXTURE (FJAF) SHIM CALCULATION PROCEDURE
(Morton Thiokol) 19 p**

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MORTON THIOKOL, INC.

Aerospace Group

Space Operations

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FIELD JOINT ASSEMBLY FIXTURE (FJAF)
SHIM CALCULATION PROCEDURE

May 1989

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REVISION PAGE

Revision	Date	Description
A	May, 1989	<p>Revise Appendix A to show changes due to switching of the Right(B) FWD Segment.</p> <p>Add Appendix B Flight 8 calculations and data.</p> <p>Add statements in Introduction that Flight 7 averaged the PMD data and Flight 8 and subsequent will take a consistent set of PMD 2 or PMD 3 data</p> <p>Revise Figure 1 layout on page 4.</p>

1.0 INTRODUCTION

The following pages document the calculations and decisions used to determine the 7U75170-01, S/N -01, Field Joint Assembly Fixture (FJAF) joint shims and Guide Block Overhang (GBO) values shown in the Stacking Specification STW9-3263.

For Flight 7 the calculations of the FJAF shims are based on the average Profile Measuring Device (PMD) measurements of the tang and clevis ends of the bare metal case components. They are also based on using a "standard delta" difference between the uncompressed circumferential length of the outer clevis leg and the unstretched circumferential length of the FJAF. For the 7U75170 FJAF at the Vehicle Assembly Building (VAB) this "standard delta" is 0.400 inch (based on previous measurements taken during stacking operations).

For Flight 8 and subsequent motors the calculations will not be based on the average PMD measurements, but on a consistent set of PMD 2 or PMD 3 measurements.

2.0 SUMMARY

The data and spreadsheet calculations for each flight set will be shown in Appendices to this document, beginning with Flight 7 in Appendix A.

3.0 DISCUSSION

Data from the PMD and micrometer measurements of the tang and clevis joints taken at the Morton Thiokol, Inc. Case Refurbishment Area should be recorded from the shop travelers and noted on the form in Figure 1.

The case numbers, diameters, and outer clevis leg thicknesses may then be entered on a spreadsheet to perform the simple calculations required (see Figure 2). Figure 2 contains actual data for Flight 7. The shim value given is the total for all four joints, which is distributed nearly equally in the four joints.

The shim totals for each joint should be compared to the possible combinations worked out in Table 1. The nearest size combination should be chosen. For example: the Left (A) Forward (FWD) field joint from the Figure 2 spreadsheet shows the shim total to be 0.854 inch. The fifth combination in Table 1 (0.848 inch total) is the closest and is therefore the shim total to be used.

The values for the GBO are as calculated in the spreadsheet with a tolerance of plus 0.002 inch and minus 0.003 inch (see note at bottom of Table 1). For the right Center (CTR) and AFT field joints of Flight 7 only, with shim totals of 0.868 and 0.888 inch, the GBO values are as calculated with a plus 0.001 and minus 0.004 inch tolerance.

The circumference (designated CFJAF in the spreadsheets of this report) of the 7U75170-01, S/N 01, FJAF at the KSC VAB is 460.381 inches. This is the machined inside diameter (146.866 inches) of the contact band (less 0.002 inch of Teflon) multiplied by pi, with a total of 1.000 inch of material removed from the "joint" areas when the ring was cut into four pieces.

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RSRM _____ FLIGHT

PMD DATA FOR

CALCULATION OF

THE FJAF SHIMS

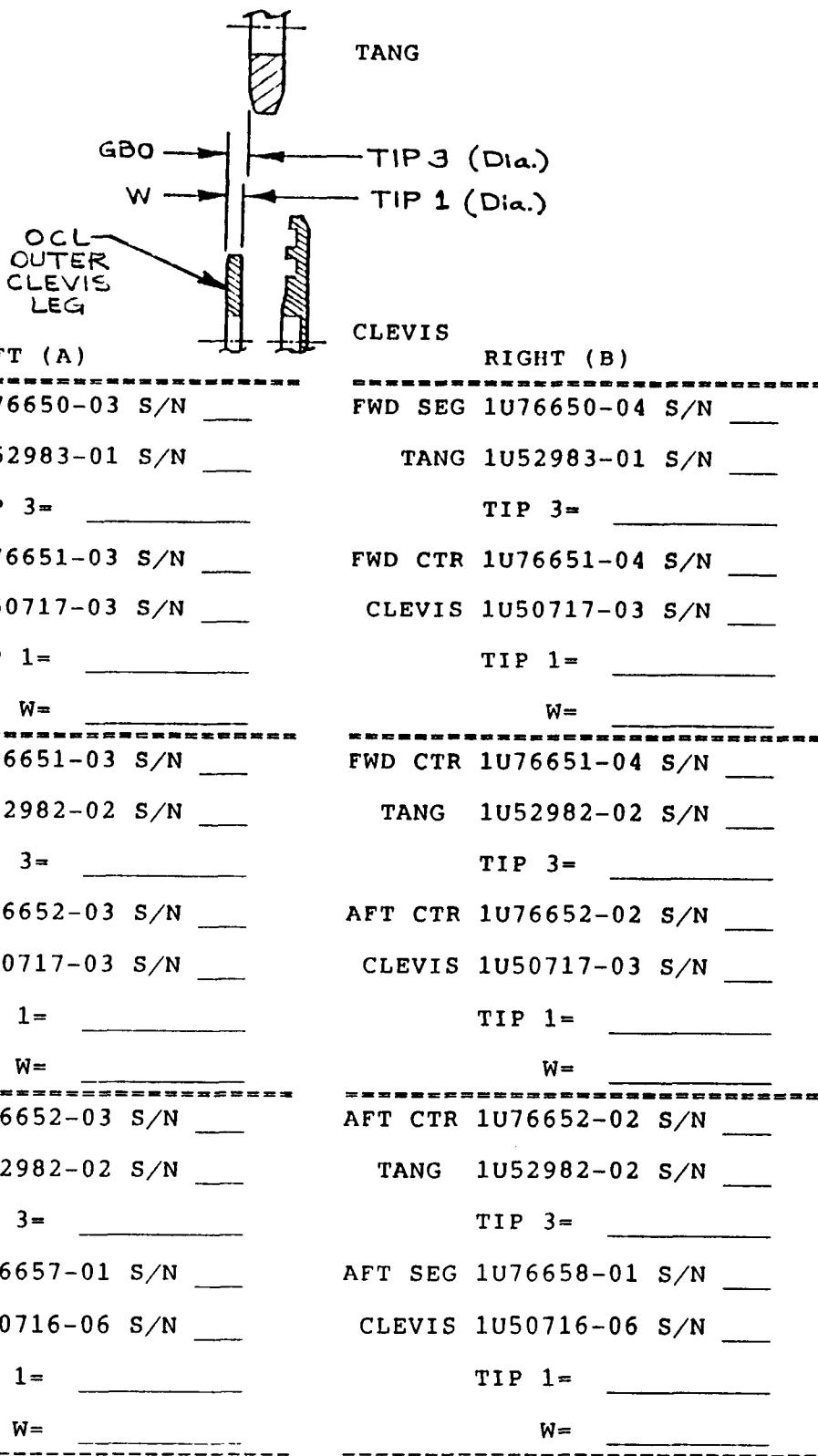


Figure 1. Sample Profile Measuring Device (PMD) Data For Calculation of H77-0442 FJAF Shims

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7TH FLIGHT

SPREADSHEET CALCULATIONS FOR THE H77-0442 FJAF SHIMS AND GBO

LEFT (A)				RIGHT (B)			
FWD	S/N	17	TANG	FWD	S/N	18	TANG
	S/N	74	CLEVIS		S/N	84	CLEVIS
TIP 3 -		T3 -	146.217	TIP 3 -		T3 -	146.218
TIP 1 -		T1 -	146.271	TIP 1 -		T1 -	146.265
		W -	0.336			W -	0.339
DOCL = T1+ 2*W =	146.943	DOCL = T1+ 2*W =	146.943				
COCL= PI *DOCL =	461.635	COCL= PI *DOCL =	461.635				
CFJAF =	460.381	CFJAF =	460.381				
D= COCL- CFJAF =	1.254	D= COCL- CFJAF =	1.254				
STANDARD DELTA =	0.400	STANDARD DELTA =	0.400				
SHIM=D-STD.DEL.=	0.854	SHIM=D-STD.DEL.=	0.854				
	*****		*****				
GBO=(DOCL-T3)/2=	0.363	GBO=(DOCL-T3)/2=	0.363				
	*****		*****				
CTR	S/N	45	TANG	CTR	S/N	43	TANG
	S/N	80	CLEVIS		S/N	96	CLEVIS
TIP 3 -		T3 -	146.210	TIP 3 -		T3 -	146.211
TIP 1 -		T1 -	146.264	TIP 1 -		T1 -	146.268
		W -	0.339			W -	0.34
DOCL = T1+ 2*W =	146.942	DOCL = T1+ 2*W =	146.948				
COCL= PI *DOCL =	461.632	COCL= PI *DOCL =	461.651				
CFJAF =	460.381	CFJAF =	460.381				
D= COCL- CFJAF =	1.251	D= COCL- CFJAF =	1.270				
STANDARD DELTA =	0.400	STANDARD DELTA =	0.400				
SHIM=D-STD.DEL.=	0.851	SHIM=D-STD.DEL.=	0.870				
	*****		*****				
GBO=(DOCL-T3)/2=	0.366	GBO=(DOCL-T3)/2=	0.369				
	*****		*****				
AFT	S/N	40	TANG	AFT	S/N	42	TANG
	S/N	30	CLEVIS		S/N	31	CLEVIS
TIP 3 -		T3 -	146.212	TIP 3 -		T3 -	146.209
TIP 1 -		T1 -	146.263	TIP 1 -		T1 -	146.275
		W -	0.340			W -	0.339
DOCL = T1+ 2*W =	146.943	DOCL = T1+ 2*W =	146.953				
COCL= PI *DOCL =	461.635	COCL= PI *DOCL =	461.666				
CFJAF =	460.381	CFJAF =	460.381				
D= COCL- CFJAF =	1.254	D= COCL- CFJAF =	1.285				
STANDARD DELTA =	0.400	STANDARD DELTA =	0.400				
SHIM=D-STD.DEL.=	0.854	SHIM=D-STD.DEL.=	0.885				
	*****		*****				
GBO=(DOCL-T3)/2=	0.366	GBO=(DOCL-T3)/2=	0.372				
	*****		*****				

Figure 2. Sample Spreadsheet Calculations For The H77-0442 FJAF Shims and Guide Block Overhang (GBO)

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TABLE 1
Possible 7U75170-01 S/N 01 FJAF Joint Shim Combinations
at the Vehicle Assembly Building (VAB)

THICKNESS OF SHIMS :	7U75170 -08 -	0.250	inches
	" -09 -	0.060	"
	" -27 -	0.117	"
	" -28 -	0.020	"
	" -29 -	0.040	"

Keeping approximately equal amounts in each FJAF joint gives the following adequately close combinations (others chosen as req'd):

No.	LOCATION	PART NUMBERS	SHIM	+ SHIM	+ SHIM =	SUBT.	TOTAL
1	A-A/224	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	B-B/134	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	C-C/ 44	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	D-D/314	7U75170-09,-27	0.06	0.117		0.177	0.768
2	A-A/224	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	B-B/134	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	C-C/ 44	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	D-D/314	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	0.788
3	A-A/224	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	B-B/134	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	C-C/ 44	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	D-D/314	7U75170-09,-27,-29	0.06	0.117	0.04	0.217	0.808
4	A-A/224	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	B-B/134	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	C-C/ 44	7U75170-09,-27,-29	0.06	0.117	0.04	0.217	
	D-D/314	7U75170-09,-27,-29	0.06	0.117	0.04	0.217	0.828
5	A-A/224	7U75170-09,-27,-28	0.06	0.117	0.02	0.197	
	B-B/134	7U75170-09,-27,-29	0.06	0.117	0.04	0.217	
	C-C/ 44	7U75170-09,-27,-29	0.06	0.117	0.04	0.217	
	D-D/314	7U75170-09,-27,-29	0.06	0.117	0.04	0.217	0.848
6	A-A/224	7U75170-09,-27,-29	0.06	0.117	0.04	0.217	
	B-B/134	7U75170-09,-27,-29	0.06	0.117	0.04	0.217	
	C-C/ 44	7U75170-09,-27,-29	0.06	0.117	0.04	0.217	
	D-D/314	7U75170-09,-27,-29	0.06	0.117	0.04	0.217	0.868
7	A-A/224	7U75170-09,-27,-28,-29	0.06	0.117	0.02	0.04	0.237
	B-B/134	7U75170-09,-27, -29	0.06	0.117		0.04	0.217
	C-C/ 44	7U75170-09,-27, -29	0.06	0.117		0.04	0.217
	D-D/314	7U75170-09,-27, -29	0.06	0.117		0.04	0.217
8	TOTAL						0.888
	A-A/224	7U75170-09,-27,-28,-29	0.06	0.117	0.02	0.04	0.237
	B-B/134	7U75170-09,-27,-28,-29	0.06	0.117	0.02	0.04	0.237
	C-C/ 44	7U75170-09,-27, -29	0.06	0.117		0.04	0.217
	D-D/314	7U75170-09,-27, -29	0.06	0.117		0.04	0.217
	TOTAL						0.908

Guide Block Overhang (GBO) values should be specified as the calculated value +.002, -.003, with none lower than 0.357 in.

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APPENDIX A

Flight 7 Profile Measuring Device (PMD) Data
and Spreadsheet Calculations, Revised To Show
the Right (B) FWD Segment Change.

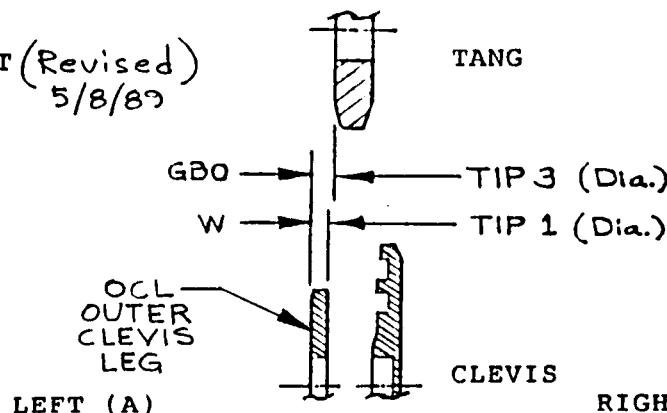
Prepared by: Don Ferney Date: 5/8/89
Checked by: G Khan Date: 5-19-89

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RSRM 7th FLIGHT (Revised)
5/8/89

PMD DATA FOR

CALCULATION OF
THE FJAF SHIMSFWD SEG 1U76650-03 S/N 03

FWD FIELD JOINT	TANG 1U52983-01 S/N <u>17</u>
	TIP 3= <u>146.2165</u>
	FWD CTR 1U76651-03 S/N <u>03</u>
	CLEVIS 1U50717-03 S/N <u>74</u>
	TIP 1= <u>146.2710</u>
	W= <u>0.336</u>

FWD CTR 1U76651-03 S/N 03

CTR FIELD JOINT	TANG 1U52982-02 S/N <u>45</u>
	TIP 3= <u>146.2075/146.2125</u>
	AFT CTR 1U76652-03 S/N <u>03</u>
	CLEVIS 1U50717-03 S/N <u>80</u>
	TIP 1= <u>146.2641</u>
	W= <u>0.339</u>

AFT CTR 1U76652-03 S/N 03

AFT FIELD JOINT	TANG 1U52982-02 S/N <u>40</u>
	TIP 3= <u>146.2125/146.2117</u>
	AFT SEG 1U76657-01 S/N <u>02</u>
	CLEVIS 1U50716-06 S/N <u>30</u>
	TIP 1= <u>146.2632</u>
	W= <u>0.340</u>

TANG

TIP 3 (Dia.)
TIP 1 (Dia.)

CLEVIS

RIGHT (B)

FWD SEG 1U76650-04 S/N 03

FWD FIELD JOINT	TANG 1U52983-01 S/N <u>05</u>
	TIP 3= <u>146.2235/146.2275</u>
	FWD CTR 1U76651-04 S/N <u>03</u>
	CLEVIS 1U50717-03 S/N <u>84</u>
	TIP 1= <u>146.2663/146.2629</u>
	W= <u>0.339</u>

FWD CTR 1U76651-04 S/N 03

CTR FIELD JOINT	TANG 1U52982-02 S/N <u>43</u>
	TIP 3= <u>146.2102/146.2110/146.2133</u>
	AFT CTR 1U76652-02 S/N <u>03</u>
	CLEVIS 1U50717-03 S/N <u>96</u>
	TIP 1= <u>146.2708/146.2665</u>
	W= <u>0.340</u>

AFT CTR 1U76652-02 S/N 03

AFT FIELD JOINT	TANG 1U52982-02 S/N <u>42</u>
	TIP 3= <u>146.2088/146.2101</u>
	AFT SEG 1U76658-01 S/N <u>02</u>
	CLEVIS 1U50716-06 S/N <u>31</u>
	TIP 1= <u>146.2760/146.2730</u>
	W= <u>0.339</u>

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7TH FLIGHT - REVISED 5/8/89

SPREADSHEET CALCULATIONS FOR THE H77-0442 FJAF SHIMS AND GBO

LEFT (A)				RIGHT (B)			
FWD FIELD JOINT	S/N S/N	17 CLEVIS	TANG	FWD FIELD JOINT	S/N S/N	05 CLEVIS	TANG
TIP 3 =		T3 = 146.217		TIP 3 =		T3 = 146.226	
TIP 1 =		T1 = 146.271		TIP 1 =		T1 = 146.265	
		W = 0.336				W = 0.339	
DOCL = T1 + 2*W =		146.943		DOCL = T1 + 2*W =		146.943	
COCL = PI *DOCL =		461.635		COCL = PI *DOCL =		461.635	
CFJAF =		460.381		CFJAF =		460.381	
D = COCL - CFJAF =		1.254		D = COCL - CFJAF =		1.254	
STANDARD DELTA =		0.400		STANDARD DELTA =		0.400	
SHIM=D-STD.DEL.=		0.854		SHIM=D-STD.DEL.=		0.854	
Use .848				Use .848			
GBO=(DOCL-T3)/2=		0.363		GBO=(DOCL-T3)/2=		0.359	
Use .360-.365				Use .357-.362			
-----				-----			
CTR FIELD JOINT	S/N S/N	45 CLEVIS	TANG	CTR FIELD JOINT	S/N S/N	43 CLEVIS	TANG
TIP 3 =		T3 = 146.210		TIP 3 =		T3 = 146.211	
TIP 1 =		T1 = 146.264		TIP 1 =		T1 = 146.268	
		W = 0.339				W = 0.34	
DOCL = T1 + 2*W =		146.942		DOCL = T1 + 2*W =		146.948	
COCL = PI *DOCL =		461.632		COCL = PI *DOCL =		461.651	
CFJAF =		460.381		CFJAF =		460.381	
D = COCL - CFJAF =		1.251		D = COCL - CFJAF =		1.270	
STANDARD DELTA =		0.400		STANDARD DELTA =		0.400	
SHIM=D-STD.DEL.=		0.851		SHIM=D-STD.DEL.=		0.870	
Use .848				Use .868			
GBO=(DOCL-T3)/2=		0.366		GBO=(DOCL-T3)/2=		0.369	
Use .363-.368				Use .365-.370			
-----				-----			
AFT FIELD JOINT	S/N S/N	40 CLEVIS	TANG	AFT FIELD JOINT	S/N S/N	42 CLEVIS	TANG
TIP 3 =		T3 = 146.212		TIP 3 =		T3 = 146.209	
TIP 1 =		T1 = 146.263		TIP 1 =		T1 = 146.275	
		W = 0.340				W = 0.339	
DOCL = T1 + 2*W =		146.943		DOCL = T1 + 2*W =		146.953	
COCL = PI *DOCL =		461.635		COCL = PI *DOCL =		461.666	
CFJAF =		460.381		CFJAF =		460.381	
D = COCL - CFJAF =		1.254		D = COCL - CFJAF =		1.285	
STANDARD DELTA =		0.400		STANDARD DELTA =		0.400	
SHIM=D-STD.DEL.=		0.854		SHIM=D-STD.DEL.=		0.885	
Use .848				Use .888			
GBO=(DOCL-T3)/2=		0.366		GBO=(DOCL-T3)/2=		0.372	
Use .363-.368				Use .368-.373			

The following shims and Guide Block Overhang (GBO) information is the result of the FLIGHT 7 spreadsheet analysis and will be specified in STW9-3263.

FLIGHT 7

NOMENCLATURE	STA (XB)	CIRCUMFERENTIAL LOCATION	PART NUMBERS	REQUIRED PER RSRM PER DASH	SHIM TOTALS
LEFT HAND					
Assembly Fixture 851		A-A/224	7U75170-09,-27,-28	1	
Field Joint		B-B/134	7U75170-09,-27,-29	1	
Guide Block Overhang 0.360-0.365		C-C/ 44 D-D/314	7U75170-09,-27,-29 7U75170-09,-27,-29	1	0.848
Assembly Fixture 1171		A-A/224	7U75170-09,-27,-28	1	
Field Joint		B-B/134	7U75170-09,-27,-29	1	
Guide Block Overhang 0.363-0.368		C-C/ 44 D-D/314	7U75170-09,-27,-29 7U75170-09,-27,-29	1	0.848
Assembly Fixture 1491		A-A/224	7U75170-09,-27,-28	1	
Field Joint		B-B/134	7U75170-09,-27,-29	1	
Guide Block Overhang 0.363-0.368		C-C/ 44 D-D/314	7U75170-09,-27,-29 7U75170-09,-27,-29	1	0.848
RIGHT HAND					
Assembly Fixture 851		A-A/224	7U75170-09,-27,-28	1	
Field Joint		B-B/134	7U75170-09,-27,-29	1	
Guide Block Overhang 0.357-0.362		C-C/ 44 D-D/314	7U75170-09,-27,-29 7U75170-09,-27,-29	1	0.848
Assembly Fixture 1171		A-A/224	7U75170-09,-27,-29	1	
Field Joint		B-B/134	7U75170-09,-27,-29	1	
Guide Block Overhang 0.365-0.370		C-C/ 44 D-D/314	7U75170-09,-27,-29 7U75170-09,-27,-29	1	0.868
Assembly Fixture 1491		A-A/224	7U75170-09,-27,-28,-29	1	
Field Joint		B-B/134	7U75170-09,-27, -29	1	
Guide Block Overhang 0.368-0.373		C-C/ 44 D-D/314	7U75170-09,-27, -29 7U75170-09,-27, -29	1	0.888

MORTON THIOKOL, INC.

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APPENDIX B

**Flight 8 Profile Measuring Device (PMD) Data
and Spreadsheet Calculations.**

Prepared by: Don Ferney Date: 5/19/89

Checked by: Eggers Date: 5-19-89

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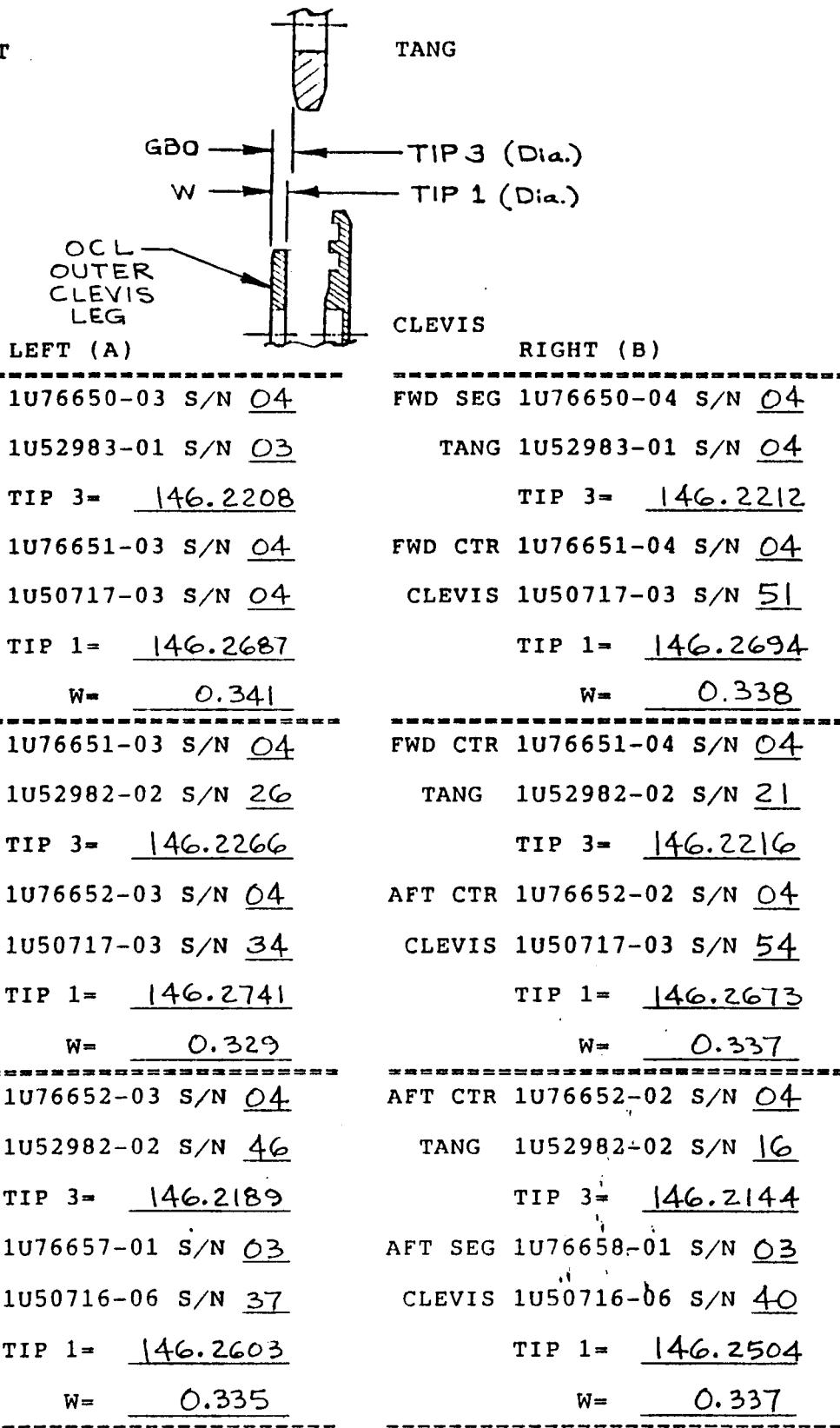
Space Operations

RSRM 8th FLIGHT

PMD DATA FOR

CALCULATION OF

THE FJAF SHIMS



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Space Operations

=====
8TH FLIGHT - 5/17/89
=====

SPREADSHEET CALCULATIONS FOR THE H77-0442 FJAF SHIMS AND GBO

LEFT (A)

RIGHT (B)

FWD	S/N	03	TANG	FWD	S/N	04	TANG
FIELD	S/N	04	CLEVIS	FIELD	S/N	51	CLEVIS
JOINT				JOINT			
TIP 3 =		T3 =	146.2208	TIP 3 =		T3 =	146.2212
TIP 1 =		T1 =	146.2687	TIP 1 =		T1 =	146.2694
		W =	0.341			W =	0.338
DOCL = T1 + 2*W =		146.951		DOCL = T1 + 2*W =		146.945	
COCL= PI *DOCL =		461.659		COCL= PI *DOCL =		461.643	
CFJAF =		460.381		CFJAF =		460.381	
D= COCL- CFJAF =		1.278		D= COCL- CFJAF =		1.262	
STANDARD DELTA =		0.400		STANDARD DELTA =		0.400	
SHIM=D-STD.DEL.=		0.878		SHIM=D-STD.DEL.=		0.862	
		Use .868				.868	
GBO=(DOCL-T3)/2=		0.365		GBO=(DOCL-T3)/2=		0.362	
		Use .362-.367				.359-.364	
CTR	S/N	26	TANG	CTR	S/N	21	TANG
FIELD	S/N	04	CLEVIS	FIELD	S/N	54	CLEVIS
JOINT				JOINT			
TIP 3 =		T3 =	146.2266	TIP 3 =		T3 =	146.2216
TIP 1 =		T1 =	146.2741	TIP 1 =		T1 =	146.2673
		W =	0.329			W =	0.337
DOCL = T1 + 2*W =		146.932		DOCL = T1 + 2*W =		146.941	
COCL= PI *DOCL =		461.601		COCL= PI *DOCL =		461.630	
CFJAF =		460.381		CFJAF =		460.381	
D= COCL- CFJAF =		1.220		D= COCL- CFJAF =		1.249	
STANDARD DELTA =		0.400		STANDARD DELTA =		0.400	
SHIM=D-STD.DEL.=		0.820		SHIM=D-STD.DEL.=		0.849	
		Use .828				.848	
GBO=(DOCL-T3)/2=		0.353		GBO=(DOCL-T3)/2=		0.360	
		Use .357-.362 min.				.357-.362	
AFT	S/N	46	TANG	AFT	S/N	16	TANG
FIELD	S/N	37	CLEVIS	FIELD	S/N	40	CLEVIS
JOINT				JOINT			
TIP 3 =		T3 =	146.2189	TIP 3 =		T3 =	146.2144
TIP 1 =		T1 =	146.2603	TIP 1 =		T1 =	146.2504
		W =	0.335			W =	0.337
DOCL = T1 + 2*W =		146.930		DOCL = T1 + 2*W =		146.924	
COCL= PI *DOCL =		461.595		COCL= PI *DOCL =		461.577	
CFJAF =		460.381		CFJAF =		460.381	
D= COCL- CFJAF =		1.214		D= COCL- CFJAF =		1.196	
STANDARD DELTA =		0.400		STANDARD DELTA =		0.400	
SHIM=D-STD.DEL.=		0.814		SHIM=D-STD.DEL.=		0.796	
		Use .808				.788	
GBO=(DOCL-T3)/2=		0.356		GBO=(DOCL-T3)/2=		0.355	
		Use .357-.362				.357-.362	

The following shims and Guide Block Overhang (GBO) information is the result of the FLIGHT 8 spreadsheet analysis and will be specified in STW9-3263.

FLIGHT 8

NOMENCLATURE	STA (XB)	CIRCUMFERENTIAL LOCATION	PART NUMBERS	REQUIRED PER RSRM PER DASH	SHIM TOTALS
LEFT HAND					
Assembly Fixture 851		A-A/224	7U75170-09,-27,-29	1	
Field Joint		B-B/134	7U75170-09,-27,-29	1	
Guide Block Overhang 0.362-0.367		C-C/ 44 D-D/314	7U75170-09,-27,-29 7U75170-09,-27,-29	1	0.868
Assembly Fixture 1171		A-A/224	7U75170-09,-27,-28	1	
Field Joint		B-B/134	7U75170-09,-27,-28	1	
Guide Block Overhang 0.357-0.362		C-C/ 44 D-D/314	7U75170-09,-27,-29 7U75170-09,-27,-29	1	0.828
Assembly Fixture 1491		A-A/224	7U75170-09,-27,-28	1	
Field Joint		B-B/134	7U75170-09,-27,-28	1	
Guide Block Overhang 0.357-0.362		C-C/ 44 D-D/314	7U75170-09,-27,-28 7U75170-09,-27,-29	1	0.808
RIGHT HAND					
Assembly Fixture 851		A-A/224	7U75170-09,-27,-29	1	
Field Joint		B-B/134	7U75170-09,-27,-29	1	
Guide Block Overhang 0.359-0.364		C-C/ 44 D-D/314	7U75170-09,-27,-29 7U75170-09,-27,-29	1	0.868
Assembly Fixture 1171		A-A/224	7U75170-09,-27,-28	1	
Field Joint		B-B/134	7U75170-09,-27,-29	1	
Guide Block Overhang 0.357-0.362		C-C/ 44 D-D/314	7U75170-09,-27,-29 7U75170-09,-27,-29	1	0.848
Assembly Fixture 1491		A-A/224	7U75170-09,-27,-28	1	
Field Joint		B-B/134	7U75170-09,-27,-28	1	
Guide Block Overhang 0.357-0.362		C-C/ 44 D-D/314	7U75170-09,-27,-28 7U75170-09,-27,-28	1	0.788

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